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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,539	03/26/2002	Todd Wisdom	B19-061	7472

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EXAMINER

WACHTEL, ALEXIS A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/019,539	<b>Applicant(s)</b> WISDOM ET AL.	
	<b>Examiner</b> Alexis Wachtel	<b>Art Unit</b> 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2002.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                    |                                                                             |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____                                                |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8-02; 3-02</u> .                                                          | 6) <input type="checkbox"/> Other: _____                                    |

***Detailed Action***

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 13 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. With respect to claim 13, Applicant fails to provide a disclosure within the specification that supports the claimed subject matter.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-20,22,24-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0 706 814 A1 to Okazoe in view of US 5,413,765 to Smith et al.

With respect to claim 1, Okazoe teaches an oxidative reactor to supports the formation and precipitation of calcium sulfate from calcium sulfite, said reactor comprising: a tank (21), having walls and a bottom, for holding an aqueous slurry of

Art Unit: 1764

calcium sulfite; an inlet (Fig.1) in said tank for delivery of said aqueous slurry from a source thereof to said tank; a fine (30,31,32,22) bubble generator in fluid communication with said aqueous slurry for introducing fine bubbles of an oxygen-containing gas into said aqueous slurry; and a mixer (30,31,32,22) in said tank to distribute said bubbles into said aqueous slurry and to maintain the circulation of said aqueous slurry and bubbles in said tank; whereby a circulation path for said aqueous slurry and bubbles is created in said tank defining an oxidation zone occupy a significant volume of the tank, and said precipitated calcium sulfate circulates in said circulation path.

Okazoe fails to teach the use of a flow diverter in the tank to reduce rotation of the aqueous solution in the tank. Smith teaches a flow diverter (34) that functions to reduce rotation of the aqueous solution in the tank. In view of this teaching it would have been obvious to one of ordinary skill in the art at the time the invention was made to have integrated a flow diverter as disclosed by Smith with the reactor disclosed by Okazoe. One of ordinary skill would have been motivated by the desire to effect rapid mass transfer between gaseous and liquid phases (Smith Col 3, lines 10-12).

With respect to claim 2, the limitation wherein said gas is air does not structurally distinguish the claimed invention over the relied on prior art.

With respect to claim 3, the limitation wherein said air in said fine bubbles is introduced into slurry at substantially the same temperature as the ambient air temperature adjacent said tank does not structurally distinguish the claimed invention over the relied on prior art.

Art Unit: 1764

With respect to claim 4, a rotor (Fig.1, items 30,31,32,22) rotatable in said tank and constituting at least part of said fine bubble generator and said washer.

With respect to claim 5, wherein said rotor constitutes said mixer (Fig.1, items 30,31,32,22).

With respect to claim 6, wherein said rotor has an internal cavity (Fig.1, item 31), and constitutes at least part of said fine bubble generator. Okazoe fails to teach that the rotor is formed at least in part of gas permeable material. However, it would have been obvious to one of ordinary skill to have integrated a gas permeable material with the rotor motivated by the desire to improve gas transfer throughout the apparatus.

With respect to claim 7, Okazoe does not teach a stator assembly around said rotor defining flow paths for said aqueous slurry and constituting at least part of said mixer. Smith discloses a stator assembly (Fig.2, item 34) arranged around a rotor defining flow paths for the aqueous slurry and constituting at least part of the mixer. In view of this teaching it would have been obvious to one of ordinary skill to have integrated the stator assembly disclosed by Smith such that the stator is arranged around the rotor. One of ordinary skill would have been motivated by the desire to affect rapid mass transfer between gaseous and liquid phases (Smith, Col 3, lines 10-12).

With respect to claim 8, a standpipe (Okazoe, Fig.1, item 31) mounted above said fine bubble generator.

With respect to claim 9, Examiner notes that the apparatus disclosed by Okazoe and Smith is capable of functioning as a washer for cleaning said fine bubble generator of solids that result from the formation and precipitation of said calcium

Art Unit: 1764

sulfate. Identifying functions that are not present in the prior art does not make these functions non-obvious or non-inherent if the structural limitations of the claimed invention are present.

With respect to claim 10, Okazoe does not teach a draft tube mounted below said mixer, said draft tube constituting at least part of said flow diverter. Smith discloses a draft tube (Fig.5, item 110, Col 18, line 38). In view of this teaching it would have been obvious to one of ordinary skill at the time the invention was made to have included a draft tube in the apparatus of Okazoe motivated by the desire to guide the liquid into the region of the impeller (Smith, Col 18, lines 38-41).

With respect to claim 11, Okazoe does not teach a false floor positioned below said draft tube; whereby said draft tube and false floor together constitute at least part of said flow diverter. Smith discloses a false floor (Fig.1) below the mixer. In view of this teaching it would have been obvious to one of ordinary skill at the time the invention was made to have

With respect to claim 12, an outlet in said tank for discharge of sulfate compounds from said tank, said inlet and said outlet positioned at spaced locations around said tank, but at substantially the same elevation from said tank bottom.

With respect to claim 14, whereby the size of precipitated sulfate compounds increases as said precipitate flows along said circulation path does not structurally distinguish the claimed invention over the relied on prior art.

With respect to claim 15, an oxidative reactor system for oxidizing salts in an aqueous solution, said system comprising at least one tank (Fig.1, item 21), having walls and a bottom, for holding said aqueous solution of a reduced salt; at least one inlet in said tank (Fig.1, line coming from item 46) for delivery of said solution from a source thereof to said tank; at least one fine bubble generator (Fig.1, items 30-32,22) in fluid communication with said solution for introducing fine bubbles of oxygen containing gas into said solution; and; and at least one mixer Fig.1, items 30-32,22) in said tank to distribute said bubbles into said aqueous slurry and to maintain the circulation of said aqueous and bubbles in said tank; whereby at least one circulation path for said aqueous solution and bubbles is created in said tank defining an oxidation zone occupying a significant volume of said tank, and said oxidized salts flow along said at least one circulation path.

Okazoe fails to teach the use of a flow diverter in the tank to reduce rotation of the aqueous solution in the tank. Smith teaches a flow diverter (34) that functions to reduce rotation of the aqueous solution in the tank. In view of this teaching it would have been obvious to one of ordinary skill in the art at the time the invention was made to have integrated a flow diverter as disclosed by Smith with the reactor disclosed by Okazoe. One of ordinary skill would have been motivated by the desire to effect rapid mass transfer between gaseous and liquid phases (Smith Col 3, lines 10-12).With

respect to claim 16, at least one scrubber constituting said source of said aqueous solution.

With respect to claim 17, Examiner notes that the apparatus disclosed by Okazoe and Smith is capable of functioning as a washer for cleaning said fine bubble generator of solids that result from the formation and precipitation of said calcium sulfate. Identifying functions that are not present in the prior art does not make these functions non-obvious or non-inherent if the structural limitations of the claimed invention are present.

With respect to claim 18, wherein said gas in said fine bubbles is introduced into said aqueous solution at substantially the same temperature as the ambient air temperature adjacent said at least one tank does not structurally distinguish the claimed invention over the relied on prior art.

With respect to claim 19, wherein said aqueous solution is an aqueous slurry of calcium sulfite does not structurally distinguish the claimed invention over the relied on prior art.

With respect to claim 20, at least one dewatering device (Fig.1, item 42) for removing water from said sulfate salts discharged from said tank.

With respect to claim 22, a second dewatering device downstream of said at least one dewatering device (Fig.1, item 44).

With respect to claim 23, wherein said second dewatering device comprises a vacuum filter (44).



Art Unit: 1764

With respect to claim 24, Okazoe teaches a method for formation of oxidized salts from an aqueous solution of salts, comprising: providing a tank (Fig.1, item 21) having an inlet (Fig.1, line from item 46); introducing an aqueous solution containing a reduced salt to said tank (Col 1, lines 34-47); delivering a flow of fine bubbles of an oxygen containing gas to said aqueous solution; and oxidizing said salt to its oxidized form (Col 1, lines 34-47); and circulating said aqueous solution and said bubbles in said tank, whereby said oxidized salt is substantially uniformly distributed in said aqueous solution (Col 1, lines 34-47).

Okazoe does not teach reducing the rotation of the aqueous solution in said tank. Smith discloses reducing the rotation of the aqueous solution in the tank (Fig.2, item 34). In view of this teaching it would have been obvious to one of ordinary skill at the time the invention was made to have integrated the shroud of Smith with the apparatus used in the process disclosed by Okazoe. One of ordinary skill would have been motivated by the desire to further disperse the bubbles in the solution and effect improved mass transfer and rapid reaction.

With respect to claim 25, providing air as said gas (Col 1, line 45).

With respect to claim 26, absent evidence to the contrary said gas is provided at substantially the same temperature as the ambient air temperature adjacent said tank.

With respect to claim 27, Okazoe discloses adjusting pH of said aqueous solution (Col 6, lines 1-8). The particular value chosen is a result effective variable and readily seen as adjustable by one of ordinary skill in the art.

With respect to claim 28, providing said aqueous solution from a scrubber (Fig.1).

With respect to claim 29, Okazoe discloses desulfurizing flue gas in said scrubber to form a reduced salt comprising a sulfite (Col 1, lines 34-47)

With respect to claim 30, while Okazoe does not explicitly teach cleaning said bubble generator of solids tending to accumulate on said generator it is reasonable to assume that apparatus and process of Okazoe is capable of doing so since the prior art apparatus has the same features as the instant invention and the same cleaning activity described for the present invention also takes place with the apparatus of the prior art.

With respect to claim 31, Okazoe teaches dewatering said oxidized salt (Col 4, lines 45-50).

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0 706 814 A1 to Okazoe in view of US 5,413,765 to Smith et al and US 5,648,048 to Kuroda et al.

With respect to claim 21, while Okazoe as set forth above teaches the use of dewatering device (labeled as a thickener 42), the reference fails to teach the use of a hydrocyclone. Kuroda et al teaches the use of hydrocyclone for the purpose of removing water from a slurry (Col 15, lines 1-15). Since the hydrocyclone and thickener are functionally equivalent, it would have been a mere matter of engineering choice to have employed a hydrocyclone instead of the thickener (42).

Art Unit: 1764

***Prior Art of Record***

6. The prior art of record and not relied upon is considered pertinent to Applicant's disclosure. In addition, the following references are cited for disclosing various aspects of Applicant's invention: US 3647069; US 3491880; US 3993563; US 4889701; US 4737272; US 5413765

***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex Wachtel whose telephone number is 571-272-1455. The examiner can normally be reached on 10:30am to 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Glenn Caldarola, can be reached at (571)-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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